

Region 5

Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

Coordinated Effort Improves Plant Operation

Sandwich WWTP, Illinois

The Sandwich Wastewater Treatment Plant in Illinois was floundering in multiple compliance problems during the first seven months of 1995. In fact, compliance limits were exceeded every month for at least one parameter, and in April the only limit *not* exceeded was pH.

In January 1996, the plant was evaluated by a 104(g)(1) technical assistance provider, who later reported that “process control was sort of trial by MLSS [mixed liquor suspended solids].” The microscope was seldom used for process control, and internal plant processes not well managed. Another problem was that the plant influent occasionally bore a distinct solvent aroma.

Ongoing process control monitoring allows the plant to address problems before they become compliance issues.

In an amazing turnaround, the plant was brought back into full compliance through a coordinated effort by area experts—104(g)(1) funded assistance from the Ohio Environmental Protection Agency, EPA trainers and enforcers, a Twin Cities Metro WWTP

microbiologist, and Sandwich operators and administrators. The partnership addressed the problems of industrial loading and process control, and the plant was returned to full compliance just three months after the initial diagnostic evaluation. In that period of time, ammonia levels dropped by 98 percent, oxygen demanding pollutants were 60 percent lower, and solids decreased by one third. Ongoing process control monitoring allows the plant to address problems before they become compliance issues.

Since receiving 104(g)(1) assistance, the Sandwich WWTP has continued to achieve exceptional performance. The notable efforts of the 104(g)(1) trainer and the community won the Sandwich WWTP 2nd place in U.S. EPA Region 5 as the Most Improved Plant for 1999.



Chlorine addition at the Sandwich WWTP controls filamentous bacteria.

Finding Qualified Operators Challenges Small Communities

Granville WWTP, Illinois

A common weakness of wastewater treatment plants in smaller communities is their limited hiring base. All too often this translates to inexperienced and untrained operators being put in charge of increasingly complex equipment and conducting increasingly complex processes. The 104(g)(1) program provides the necessary training for these new environmental professionals.

The situation at Granville, Illinois, is just such an example. Granville is a former coal mining town of about 1,400 people located in northwestern Illinois. Granville's former police chief Lou Verda had taken the job as operator at the town's wastewater treatment plant. In addition to the problem of his inexperience, the facility's package plant was "completely septic, with high solids levels," according to the 104(g)(1) report on the facility.

In early 1999, Dennis Connor of the Illinois Environmental Protection Agency began



Operations personnel re-piped the plant influent and automated the activated sludge wasting process. These changes improved effluent quality and reduced operator time at the plant. The city of Granville saved money on both.

coordinating 104(g)(1) assistance to the Granville facility. In addition to a variety of plant alterations and improvements, Connor coordinated the former police chief's operator training. Connor reported that the new operator, Lou Verda, "enthusiastically" applied these new skills to Granville's facility. Chuck Corley, another 104(g)(1) provider, even attended one of Granville's town council meetings, to discuss the treatment plant's situation and additional needs.

The results of 104(g)(1) assistance included both significantly cleaner effluent *and* a well-trained operator.

Limited Help Yields Big Results

Newberry WWTP, Michigan

In early 1998, non-compliance caused a district office of Michigan's Surface Water Quality Division to refer the Newberry Wastewater Treatment Plant to the 104(g)(1) Operator Training Unit of Michigan's Department of Environmental Quality. The plant was out of compliance with all permit limits. Both the concentration of biochemical oxygen demand and suspended solids in the effluent often reached 70 to 80 mg/L—well over the 30 mg/L limits. Also, the phosphorus concentration often exceeded the 1 mg/L limit.

The 104(g)(1) technical assistance provider determined that the primary reason for the non-compliance was the development of filamentous organisms in the plant's secondary system. Poor control of secondary sludge return flows, inconsistent control of wasting, poor solids handling practices, and periodic equipment failures were all found to be contributing to the plant's problems.



Primary clarifiers at the Newberry WWTP, where technical assistance greatly enhanced process control.

The situation was immediately improved by the eradication of the filamentous bacteria and by improved control practices. The length of the 104(g)(1) assistance was extended because of plant personnel problems, including the replacement of the superintendent twice. The new superintendent was instructed in proper control practices and gained a good understanding of process control, the application of secondary control practices, proper solids handling procedures, and the importance of a good preventive maintenance program. As a result of only four 104(g)(1) visits to the plant and a couple of dozen phone calls, the facility's effluent biochemical oxygen demand and suspended solids are now consistently below 10 mg/L, just one-third of the permit limit. All other permit limits are also being met.

Assistance Lowers Phosphorus Levels

Carson City WWTP, Michigan

The wastewater treatment plant that serves Carson City, Michigan, had never met its permit limits for phosphorus. In an effort to bring those levels down, the plant's operators had been adding ferric chloride to the influent

at about 100 gallons of solution per day. Even though the amount of chemical being fed was higher than the calculated amount required, it was not removing the phosphorus.

Michigan's Surface Water Quality Division referred the situation to Doug Hill, a 104(g)(1) assistance provider with Michigan's Department of Environmental Quality's Operator Training Unit. In late 1992, Hill coordinated jar testing on samples at the five-cell lagoon system to determine a better point for phosphorus removal than the first-cell application. At Hill's recommendation, in the summer of 1993, a temporary ferric chloride feed system was installed between the fourth and fifth lagoons. The phosphorus concentration dropped throughout the summer, and by the fall, the phosphorus level was well under the facility's 1 mg/L limit.

The temporary feed system was replaced with a permanent line, and the plant has been in compliance with the discharge permit from that time to the present.



A temporary ferric chloride feed system was installed between the fourth and fifth lagoons to reduce the phosphorus concentrations at the Carson City WWTP.

Community Dodges Costly Upgrades

Village of Richwood WWTP, Ohio

In 1995, multiple problems plagued the Richwood WWTP. Operator neglect and the inexperience of newly hired employees were chief among these, causing an average of 112 permit violations annually in 1995 and 1996. As a result, the village of Richwood was suffering not only from the effects of excessive pollutant discharge and resultant enforcement action, but officials were facing an unexpected \$1.9 million construction grant repayment because the plant was not meeting its certification requirements.

“The words EPA and cooperation and help are often considered to be an oxymoron. Your team certainly helped to dispel that myth.”

—R.A. Bell, Mayor of Lodi, Ohio, 1994

Through the 104(g)(1) Operator Assistance Program, Jim Borton of Ohio’s Environmental Protection Agency Compliance Assistance Unit evaluated the system’s problems and prioritized its needs to bring it back into compliance as quickly as possible. Borton, working with the highly motivated village officials, concentrated on intensive operator training, while coaching village officials on appropriate steps they could take to assist in the plant’s recovery.

Borton also noted that the facility suffered from infiltration and inflow problems, especially during rain events, when flow levels sometimes more than tripled. Borton’s recommendations concerning this issue helped the village qualify for and receive a \$225,000 state



Jim Borton and Plant Superintendent discussing process control by SBR at Richwood WWTP.

grant and \$300,000 community development block grant for a sewer rehabilitation project.

As a result of approximately one year of 104(g)(1) assistance, the plant’s pollutant discharge was reduced dramatically, including an 80 percent reduction in carbonaceous biochemical oxygen demand and an 84 percent reduction in total suspended solids. Effluent violations were reduced by 85 percent. The plant earned a positive certification, and the village was able to avoid the \$1.9 million grant repayment. If the 104(g)(1) assistance had been provided by private engineering consultants, the village would have had to pay approximately \$75,000—a more than ten-fold increase over the state and federally funded 104(g)(1) assistance.

Based on these dramatic changes, the Richwood WWTP won second place in EPA Region 5 as the Most Improved Plant for 1998.

Struggling Plant Turned Around Through Assistance

City of Fostoria WWTP, Ohio

In the first part of 1996, the wastewater treatment plant for the City of Fostoria, Ohio, was almost continuously in violation of its ammonia and suspended solids limits and was occasionally exceeding its carbonaceous biochemical oxygen demand limit. Scott Ankrom of the Ohio Environmental Protection Agency's Compliance Assistance Unit began providing 104(g)(1) assistance to the struggling plant.

Ankrom's initial evaluation found that, despite recent upgrades, the WWTP was experiencing significant loss of solids, as well as difficulty in achieving complete nitrification. It was determined that the nitrification and suspended solids problems resulted from "starvation" of the activated sludge biomass. Essentially, the primary clarifiers and trickling filters were removing too much organic waste, which is food for the biomass.

Ankrom suggested an alteration to the system that would allow the development of the proper biomass in the activated sludge system.



Activated sludge basins at Fostoria WWTP.

In addition, dye testing of the secondary clarifiers revealed a problem that degraded clarifier performance. Weirs and baffles were installed to improve clarifier performance. The 104(g)(1) assistance also included process control and laboratory training.

The assistance reduced the plant's discharge of suspended solids by 67 percent and ammonia discharge by 64 percent. The reduction of chemical usage by 39 percent led to total chemical cost savings of \$20,750. After only 15 months of alterations and operator training, the plant was in full compliance during normal flows.

"The plant operators and [I] gained a better understanding of operations and theory regarding our specific treatment plant. The program that you are involved in is very beneficial to all wastewater plants."

—Michael L. Ritter, Chief Operator,
Fostoria Water Pollution Control Center

By documenting compliance, Fostoria was able to gain a positive certification on a construction loan through Ohio EPA's Water Pollution Control Loan Fund program. The City was also able to gain the dismissal of an enforcement action through the Ohio Attorney General's Office. If the City had sought assistance through a private engineering firm, it is estimated that the 104(g)(1) help would have cost approximately \$112,500.

Newly Hired Operator Benefits from 104(g)(1) Training

Pleasant Valley Regional Sewer District WWTP, Ohio

Taking on almost any new job carries with it the risk of inheriting problems from your predecessor. This is what happened to the newly hired manager of the Pleasant Valley Regional Sewer District in Ohio. He quickly realized that his sewer district was struggling with some serious problems that would be difficult to resolve without outside help.

In the spring of 1994, the plant manager contacted the Ohio EPA's 104(g)(1) Compliance Assistance Unit and requested an evaluation of the system. The evaluation identified 15 factors limiting the performance of the treatment system. Aeration capabilities in the oxidation ditches were inadequate, and only one of the two ditches was operational. The out-of-compliance system was suffering from excessive infiltration, insufficient staffing, inadequate financial planning and equipment, and communication problems.

"I must take a moment to express my pleasure with [Ohio] EPA's proactive approach in helping operators of failing POTWs. It certainly is encouraging to see Ohio EPA assuming a mentoring posture toward operators who are experiencing problems meeting NPDES permits."

—Larry Cole, Superintendent of Beavercreek Wastewater Treatment Plant, Beavercreek, Ohio

Treatment plant staff in partnership with 104(g)(1) technical assistance providers quickly addressed each of these concerns. For

instance, they pursued loans to purchase necessary equipment, contracted out for smoke testing to assess infiltration problems, doubled the treatment staff, and designed the 18-year-old system's first operating budget.

This aggressive approach to problem solving paid off. The once-out-of-compliance system was totally turned around within 18 months.

Number of reportable NPDES violations

1996	84 violations reported
1997	52 violations reported
1998	6 violations reported

This impressive turnaround won the facility EPA's 1999 Most Improved Plant Award.

Plant Overcomes Many Problems to Win EPA Award

Elk Mound WWTP, Wisconsin

The Elk Mound Wastewater Treatment Plant in western Wisconsin is an excellent example of a community successfully overcoming the wide variety of challenges that face smaller facilities.

Extreme wet weather conditions, an aging collection system, limited financial resources, stringent effluent requirements, and multiple demands on the operating staff were all problems at Elk Mound. With assistance from 104(g)(1) trainers from Wisconsin's Department of Natural Resources, these problems were overcome, enabling the facility to win first place in the 1999 EPA awards for Operation and Maintenance in the Small Advanced Category.

The collection system in Elk Mound consists of two lift stations and approximately 4 miles of 30-year-old clay pipe installed in an area of

shallow bedrock and high groundwater. In recent history, the wet weather flow has risen from a normal average of 50,000 gallons per day to an extreme peak of over 1.0 million gallons per day. Heavy rains often resulted in the discharge of raw sewage.

To control this situation, the village undertook an aggressive program that included budgeting and repairing all failing areas, rebuilding the lift stations, doubling the amount of storm sewer capacity throughout the collection system, and implementing a door-to-door inspection and education program. They were rewarded for these efforts by a 60 percent reduction in their infiltration/inflow rate.

In addition to conquering its infiltration problems, the Elk Mound facility recycles all sludge from the facility to agricultural land as a soil amendment and fertilizer. Approximately 80,000 gallons of sludge are spread each spring and fall. Minor plant modifications and diligent attention to details contribute to the facility routinely going beyond normal compliance and producing effluent with concentrations in the single digits.

Violations Reduced After Following Recommendations

Dale Sanitary District WWTP, Wisconsin

In the late 1980s and into the early 1990s, the Dale Sanitary District WWTP in Wisconsin was struggling with numerous violations of its effluent limits. Dissolved oxygen, biochemical oxygen demand levels, pH and total suspended solids levels were all problems. At the facility's request, a team of 104(g)(1) technical assistance providers from EPA Region 5 undertook a week-long evaluation of the facility's aerated pond system.

The 104(g)(1) team's major recommendations included immediately removing the 20-year+ bed of sludge from the polishing pond and implementing a regular schedule of sludge removal. In addition, they suggested installation of pond baffles to eliminate short circuiting, at a cost of \$10,000. As a result, the plant returned to compliance and the need for a new expensive wastewater treatment plant was eliminated.

The treatment plant began producing acceptable effluent and has remained in compliance since 1996. In 1998, the facility won second place in EPA's Most Improved Plant Award category.

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